Church is split, but still standing. In the old palace of the Governor, one part of the building fell in. There is hardly a house that has not been more or less seriously injured. The earthquake is said to have been more violent still in the neighbouring places, Balacan and Cavite, where also a lamentable loss of human life took place. Except the first two shocks, with which the earthquake began, the movement of the earth's surface was horizontal, but the *violence was not less than that in the year* 1863. If *the shocks from below* had recurred, Manilla would in all probability have been to-day but a heap of ruins.—3rd October: Yesterday evening, at six o'clock, we had a second earthquake with horizontal movement, and of rather long duration.—4th October: Yesterday evening, at eight o'clock, another earthquake of short duration. The original news from Balacan and Cavite is confirmed: in the first locality nearly all the stone houses fell in; amongst them the church, the town-hall, the parsonage, &c. — 11th October: The shocks were repeated on the two following days—(on the 4th and 5th) so that we have been visited with earthquakes on five consecutive days. Since then there has been quiet. According to the accounts received to-day from the provinces, the earthquake was felt throughout the whole of the Island of Luzon, that is to say, over an extent of country six times larger than Wales. The earthquake is said to have been most destructive in the southern province of Albay." It is evident from all this that we have here no mere ordinary earthquake, but, in point of fact, an event resembling the earthquake of 1863, as expressly observed in the passages cited.

The question will now occur to every thinking man: Is this exact concurrence of prediction with observation only an accident, or the actual expression of a law of nature? Is the circumstance that the catastrophe happened *two hours and a half after the culmination of the Moon*, which took place on that day *in the zenith of Manilla*, only a playful freak of the subterranean goblins, or is it connected with that theory according to which earthquakes occur, under favourable circumstances, at those places situated immediately over the summit of the tidal wave*? He who answers the question without previously examining into the matter, adopts certainly the most convenient method. But such is not the conduct of a friend of truth. I have derived my answer from the investigation mentioned in the commencement of this communication, and believe that what I have published is a sufficient justification for the prediction I have made; at the same time I consider that I may, in reliance upon their professional feeling, venture to demand from the representatives of science that they pass no judgment on my views, without knowing them in their entirety.

Prague RUDOLF FALB, Editor of "Sirius"

Right-Handedness

IF asked what part of the human body seems chiefly affected by advancing civilisation, I would be inclined to reply that it is the right hand.

At first sight the four-handed mammals might be thought to have an advantage; but because four hands are employed both for prehension and locomotion, while in man there is one pair of organs for each, man's two hands are worth more than the ape's four. As man rises from the rudest stages—such as digging roots, hunting, and tending cattle, to arts which are highly mechanical—the right hand becomes a more special and serviceable organ than the left, so that the loss of it to an engraver, a clerk, or an artist, compared to the loss of the left, would be a much more serious affair than it would be to a drover, who could clutch his stick or gesticulate to his dog almost as well with the one hand as the other. Admitting that, physiologically, there is a slight reason for the preference of the right hand, all our tools and fashions lend themselves to encourage its further dexterity. Screws, gimblets, &c., are made to suit the supinating motion of the right hand. Tools of the scissor kind are also made for the right hand, and I have seen a print-cutter's gauge made specially for a left-handed person fetch a very low price when it came to be sold. The slant in writing, the shed of the hair in boys, the manner in which buttons and hooks are placed on clothes, and the system of writing from left to right, all seem related to right-handedness.

In drawing, the pupil is recommended to begin at the uppermost corner on the left hand side, where the ornament is of a small and repeating character, so as to avoid fingering the part already finished. A schoolmaster I knew was able to detect left-handed boys, when they used the pen with the left against orders, by the writing either being straight or sloped the wrong way. Most boys know that it is easier to draw a profile with the face looking towards the left hand; yet on looking over the hieroglyphs in the British Museum the faces will be generally found towards the right. The normal way of writing the hieroglyphs is from right to left, though frequent instances occur of their being written from left to right.

I believe there is a constitutional reason for the preference given to the right hand, but I also believe that habit has strengthened nature's tendency, and that as the touch of the hereditary Hindoo weaver has become proverbially fine, so the aptitude of the right hand over the left is greater, with advancing civilisation, than in a state utterly savage. At that period of a child's life when creeping seems a more natural mode of progression than walking, there is no apparent dexterity in the right hand more than the left, and when man was almost utterly without arts, I can believe his state to have been ambidexter or ambisinister.

The elephant is known to employ one tusk more than another in rooting, &c., and when I asked Sir Samuel Baker which tusk went by the name of the "servant," he informed me that it was the right tusk generally, but the exceptions to the rule were far more numerous than was the phenomenon of left-handedness with human beings.

We have no reliable statistics of the proportion of left-handed persons to right in ancient or in savage nations. If Judges xx. 15, 16, is to have any weight in the matter, the proportion of left-handed in the tribe of Benjamin seems to have been greater than at the present day.

Left-handedness is very mysterious; it seems quite against physiological deductions and the whole tendency of arts and fashion. Prof. Buchanan, of Glasgow, who wrote an able memoir on right-handedness in 1862, thinks that left-handedness may be due to transposition of the viscera, and tells me that his friend Dr. Aitken found such a case. But surely transposition of the viscera must be far rarer than obstinate left-handedness. In cases of left-handed persons which I have examined, the limbs of the left side were proportionally larger, just as those of the right side are in normal cases. I have also found that left-handedness is hereditary. J. S.

The Balance of Nature

PREVIOUSLY to the recent wonderful Spectrum discoveries the sun's energy attracted more attention from *savans*, and many apparently extravagant theories were offered in explanation of this most wonderful of all physical phenomena; it is probable that the few remarks I have to make may appear equally extravagant.

As my intention is to allude more especially to the maintenance of the sun's energy, I will only make a passing observation as to its origin. The two conditions in which we find matter in the solar system are that of orbital motion and central repose; in the latter condition matter exhibits its energy in the form of light and heat; whilst in the former the light and heat are transformed into motion. If the earth was suddenly brought to a condition of rest, its energy, hitherto under the form of motion, would be exhibited as light and heat, and it would in a certain degree be converted into a sun.

If it could be shown that the sun was surrounded by an absolute non-conductor of its forces, it evidently would retain its energy for ever. As there would be no exhaustion, the sensations of light and heat would no longer exist. Now we reasonably believe that all space is filled with a highly elastic fluid or ether—this ether in a state of constant and intense action giving rise to the phenomena of solar light and heat. But if no obstacle existed to check or interfere with this action of the ether, it would, like any other body moving in space, retain its action for ever, without the necessity of a continuously acting agency or cause. If this can be granted, then it follows that the energy of the sun—which may have been necessary in the beginning to give this action to the ether—is no longer exhausted when the ether is once in motion. Hence this active ether is really an absolute preserver or non-conductor of the solar power or force, exhibiting itself as light, heat, &c.

But certain obstacles do exist to check the action of the ether. These are the various bodies which move in space and revolve

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* The point of greatest pressure outwards against the earth's crust—such pressure being caused, according to my theory, by the action of the tide of the semi-fluid central mass of the earth—is situated mathematically under the place in the zenith of which the moon is at the time. Local circumstances unfavourable to the occurrence of earthquakes *can*, and in most cases, *will*, modify the observed result, so as to cause it to vary more or less from the mathematical calculation.

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round the sun, one of which is the earth we inhabit. But the resistance which the earth offers to the motion of the ether is the cause which converts this motion into that which gives the sensation of light, heat, &c., just in the same way that other matter in motion is transformed by resistance into heat and light. A more simple illustration of what I mean would be given by supposing a current of sea-water to give out a phosphorescent light only when an obstacle to its motion is introduced, such as a stone or stick, or when the waves of the ocean give out light by dashing upon a rock or the sea-shore.

From this line of argument it will be concluded that the only causes which exhaust the sun's energy are the several planetary and other bodies, moving in space, upon which the waves of ether dash, thus transforming their energy into the sensational forces of light, heat, &c. ; but the area of these resisting bodies is exceedingly small in comparison with the rest of space, in which the ether is acting by its own energy, and without coming in contact with any resisting or exhausting obstacle.

It remains, then, to account only for the amount of the sun's energy which is absorbed or transformed by these planetary and other bodies. Although we may have thus reduced the solution of this mighty problem to a narrower space, yet it is just as difficult to account for the maintenance of the exhausted energy occasioned by a single grain of sand moving in space as by all the planetary and other bodies together.

Seeing that constant exhaustion or transfer of the sun's energy does take place, although in a much less degree than would be the case if it were not confined to the moving bodies in space alone, it remains then to account for its maintenance. The first question we should ask ourselves is this : Is there any evident or known force tending towards the sun as a centre? The immediate reply will be gravitation ; and although in the present state of scientific knowledge it may be difficult or impossible to define what gravitation is, yet there cannot be a doubt that it is a force acting on all matter, with a tendency to carry all material bodies direct to the sun. As such force dashes into or upon the sun, it becomes in its turn transformed into light, heat, &c. It is indeed not improbable that future discovery may teach us that gravitation may have its origin from and bear some certain proportion to the resistance presented by the several bodies in space, which are illuminated by the sun's energy; thus establishing the beautiful law of light and heat being transformed into the force of gravitation—gravitation again into light and heat ; thus sustaining and maintaining, for all time, the sublime fountain of motion and life, thought, and every sensation and action that organic matter is able to experience. W. L.

Sir W. Thomson and Geological Time

THE strongest statement about the retardation of the earth's motion of rotation by tidal friction, supposing the earth had been for so long a time provided with an ocean, is to be found in the appendix to a sermon preached by Professor Pritchard, F.R.S., then president of the Royal Astronomical Society, before the British Association at Nottingham. He there, in combating Darwin, says, "One million of million years ago, if the solid earth could then have been provided with an ocean, the length of the day would probably have been less than the flash of the hundredth of a second of time !"

I announced to the Literary and Scientific Society of Nottingham that this was an error in calculation, and based on a fallacy in reasoning ; and Mr. Pritchard withdrew the result, while maintaining the method, in a letter read to the meeting after a lecture on the subject that I subsequently gave. But I am informed that it has since been republished in its old shape.

There is a still more amazing statement put forward in this appendix by the champion of Anti-Darwinism. Mr. Pritchard says he is familiar with the optical structure of the human eye. He dwells on the wonderful mechanism, and hints at the wonderful chemistry of it ; and quotes the well-known passage from Darwin (Ed. 1. p. 188) in which, while he gives up all attempt at showing gradation in the structure of the eye of Vertebrata, recent and fossil, yet he shows that in the Articulata the series is more complete. He quotes this, I say, to show that Darwin undertakes to explain by natural selection the structure of the *human* eye, which is precisely what he declines to do. "Let us attend," he says, "to the process of natural selection by which this marvellous organ is said to have come into being." '"I can see," says Mr. Darwin, "no very great difficulty . . . in believing that natural selection has converted the simple apparatus of an optic nerve into an optical instrument as perfect as is possessed by any member of the great Articulate class," i.e. *as perfect as the human eye.*' Is not this amazing?

Rugby, March 22 J. M. WILSON

The Moon's Diameter

WILL you permit me to say a few words on the interesting question raised by Dr. Ingleby in your last? The sun, moon, and all the heavenly bodies appear set, as it were, in the blue sky when the weather is clear ; and as they are rarely visible unless when surrounded by at least a small space of blue sky, it seems to me that they will be naturally judged to be at the same distance from us that the sky is. But what is this distance? What, in other words, is the mean distance from which the blue light diffused or reflected from the air or vapour comes to us? Prof. Tyndall, who has devoted much attention to the causes of this blue appearance, may perhaps be able to tell us. The problem, of course, is rather an indefinite one, but an approximate solution might assist us in determining the question.

As to the heavenly bodies appearing larger when nearer the horizon, I shall leave some one else to settle the angular magnitudes in the case. Mr. Abbott, to whom Dr. Ingleby refers, proves that the fact is not confined to the heavenly bodies, but that portions of the sky seen under the same angle appear at least three times as large when near the horizon as when near the zenith ("Sight and Touch," pp. 136-7). But then, does the blue light come to us from the same mean distance when we look towards the zenith and when we look towards the horizon? or does it come from a much greater distance in the latter case, and thus apparently increase the magnitude of a portion of it whose size remains unchanged? In other words, is the sky seen as a hemisphere, or as a much smaller segment of a spherical surface (the observer being at the centre, not of a sphere, but of a small circle, the plane of which coincides with the horizon)? Most persons who look at a clear sky will, I think, adopt the latter alternative. It will be interesting to know if scientific research bears out natural impression in the case.

Other solutions of the difficulty might undoubtedly be proposed. Association of ideas, which is now the favourite device for helping a lame dog over a style, might be called to the rescue, and with some plausibility. Clouds and birds—everything, in fact, that passes above us—are nearest to us and look largest when most elevated. Elevation is thus associated with comparative nearness, and approach to the horizon with comparative distance. It is, however, simpler, if correct, to maintain that we see the sky as it really is, and that the apparent distances and magnitudes of the heavenly bodies are determined by the fact that they appear to be set in the sky, not placed at a great distance beyond it. W. H. STANLEY MONCK

Trin. Coll. Dublin, April 2

Heat Units

THE science of heat, which is capable of being made and is rapidly becoming one of the most exact of the experimental sciences, seems to labour unnecessarily under an excessive variety of units of measurement. At present there are used—

Units of Mass.	Thermometric Degrees.
Grain,	
Pound,	Centigrade,
Gramme,	Fahrenheit.
Kilogramme.	

Whence, evidently, there result *eight* different thermal units, to all of which the common name "unit of heat" is applied, or, at least, names inadequately distinctive. In the face of this it would really seem that some such suggestion as I here proceed to make must eventually be adopted.

Define, first, as follows :—A *therm* is the quantity of heat necessary to raise the temperature of 1 gramme of water from 0° C to 1° C. Secondly, 1 kilotherm = 10 hectotherms = 1000 therms = ... , thus having kilotherm, hectotherm, &c. suggestively corresponding to kilogramme, hectogramme, &c., in name as well as in nature.

Therms and kilotherms, which would probably alone be required in practice, would thus take the place of "thermal units, centigrade," "gramme-water-units," "kilogramme-units of heat," and others more or less lengthy and inexact at present to be found in writings on Heat and Energy.

College Hall, St. Andrew's, April 4. THOMAS MUIR

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